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## REVIEWS

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Time Bases (Scanning Generators). By O. S. Puckle, A.M.I.E.E. (Chapman and Hall, Ltd., London), 1943. Pp. 204. Price 16sh. net.

Time Base is the name given to those electrical devices or circuit arrangements which produce deflection potentials of suitable types for cathode-ray tubes as employed in the television or oscillograph techniques for visual observation of electrical phenomena. These potentials are made to vary at known rates with time, and hence the modern name. For television purposes as also in many applications of the oscillographic work, the familiar "Saw-tooth" time base is employed in which the rate of change is made linear with time. In case of special kinds of oscillographic work electrical circuits have been developed giving potentials varying with time in a sinusoidal, circular, radial or spiral manner as the nature of the work demands.

Time base can aptly be described as the "brains" of the whole cathode-ray oscillograph outfit in that it decides how a recurrent electrical phenomenon will appear on the fluorescent screen. Its choice "may make all the difference between success and failure" as the author says in the introduction. In spite of the fact that developments on the time bases, trigger circuits, etc., have been largely responsible for the versatility of the cathode-ray oscillograph in its manifold uses, one does not find them adequately treated in any book published so far on the subject. Need, therefore, has keenly been felt for a unified treatment in one place of the underlying principles and common-sense involved in the design, construction and uses of such circuits. The book under review does more than fulfil this hope. In a series of enlightening chapters and appendices it gives a coherent account of the basic theory in the evolution and development of various kinds of time bases, their designs and modifications, etc., in proper historical perspective.

The book is divided into ten chapters and seven appendices. The reviewer feels that the scope of the matter covered by the book can be properly gauged by giving the chapter headings which run as follows:—

I. Introduction, II. Time base wave forms, III. Types of time base, IV. Trigger circuits, V. Blocking oscillators and inductive time bases, VI. Polar co-ordinate, multiple and velocity modulation time bases, VII. Linearization of the trace, VIII. Push-pull deflection, IX. The synchronization of time bases, and X. The use of a time base for frequency division.

For consistency of the treatment several important topics are dealt with in a series of appendices; they are vital to the main subject. For instance, a short description of the advanced aspects in the design of cathode-ray tube is given in Appendix I; the remaining six being devoted to, respectively, the curvature of the charging characteristic, the charac-

teristics of a gas-discharge triode as a time base discharger valve, differentiating and integrating circuits, the generation of square waves, a method of changing the phase of a sinusoid and the effect of large shunt capacitances in the anode circuit of a valve.

A short bibliography and an index are given at the end.

A number of neat circuit diagrams and a few plates illustrate the volume.

The author who is a research engineer with Messrs. A. C. Cossor Ltd., London, is a well-known exponent of this art of electronic jugglery and is himself responsible for devising a few of these circuits; particularly, the hard valve time base which has extended the frequency limitations of the utility of the cathode-ray oscillograph from 50 kc./s. to 1000 kc./s. It is interesting to mention here that recent development of the deflection modulated type of tube, called the signal converter, is reported to have resulted in an all-round improvement in the cathode-ray tube performance.

The book is critically written—a virtue most essential to works of this type yet not often found. It essentially describes the technique as developed by the British with a few German and American circuits "thrown in" for the sake of completeness. It is free from misprints and errors. It is a fine example of its kind, authoritative, accurate and compact, but clear and cleverly written. The author has earned the gratitude of numerous workers in this field who will do well to assimilate the book rather than try to skim through.

It is indispensable to those interested in the electronic art and science. N. B. BHATT.

Switchgear Practice. By Arthur Arnold. (Chapman & Hall, Ltd., London), 1942. Pages 238 + iv. Price 22/-.

In recent years developments have been rapid and are still proceeding in almost every kind of switchgear, and a survey of practice, a sort of stock-taking as it were, is certainly useful from many points of view. This book by Mr. Arnold is a brief review of that kind and is, therefore, welcome. Again, consideration of switchgear enters into every industry and quite often engineers with very little or no experience in this field are called upon to deal with matters concerning its design, installation and operation. To them this book should serve as a useful guide as it enables them to some extent to appreciate aspects involved in the selection of switchgear.

The scope and aim of the book can be best understood by a perusal of the headings of the nineteen chapters into which the book is divided. They are: D.C. Circuit Breakers; Specialised D.C. Circuit Breakers; D.C. Motor Starters; D.C. Switch Boards; A.C. Circuit Breakers of Small and Medium Size; A.C. Motor Starters; A.C. Busbar Layout; A.C. Switchgear Types; Heavy Duty Circuit Break-